disclosed a cache adapted to store addresses of locations in physical memory available to the graphics subsystem for storing graphics data and adapted to stored addresses of locations in physical memory available to an external graphics controller hub to store graphics data (Fig. 2, Item No. 120; col. 6, lines 18-25). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to have utilized the cache disclosed by Lohman into the system of Nielsen et al because doing so would provide a cache which can be share by a memory controller as well a graphics controller in the computer system without transferring data between multiple dedicated memory units; thereby enhance the flexibility of the computer system.

6.   As per claim 7, Nielsen et al substantially disclosed the invention as claimed, including a CPU (Fig. 2, Item No. 206); a display device (col. 2, lines 48-50); a system memory adapted to store video data and non-video data (Fig. 2, Item No. 202); and a memory controller hub coupled to the CPU (Fig. 2, Item No. 204) and coupled to the system memory (Fig. 2, Item No. 202) the memory controller hub comprising: an internal graphics subsystem adapted to perform graphics operations on data (Fig. 2B; Item No. 218).
     Nielsen et al did not disclosed a cache adapted to store addresses of locations in physical memory available to the graphics subsystem for storing graphics data and adapted to stored addresses of locations in physical memory available to an external graphics controller hub to store graphics data. However, Nielsen et al did disclose a rendering engine that supports a frame buffer address translation buffer (TLB) to translate frame buffer (x, y) addresses into physical memory addresses, wherein the TLB is loaded by CPU with the base physical memory addresses (Fig. 28, Items No 208, 206). Moreover, the concepts and associated advantages of using a cache to store addresses of location physical memory; thus, as is well known in the art, both caches and buffers are often used in a similar manner (i.e. quick access to store data). Furthermore, Lohman disclosed a cache adapted to store addresses of locations in physical memory available to the graphics subsystem for storing graphics data and adapted to stored addresses of locations in physical memory available to an external graphics controller hub to store graphics data (Fig. 2, Item No. 120; col. 6, lines 18-25). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to have utilized the cache disclosed by Lohman into the system of Nielsen et al because doing so would provide a cache which can be share by a memory controller as well a graphics controller in the computer system without transferring data between multiple dedicated memory units; thereby reducing the overall amount of traffic passing between memory bridge and system memory.

Independent claims 1 and 7 require a memory controller hub having an internal graphics system and a cache. The cache is adapted to store addresses of locations in physical memory that are available to the graphics subsystem for storing graphics data. The cache is also adapted to store addresses of locations in physical memory that are available to an external graphics controller coupled to the memory controller hub for storing graphics data.